What is claimed is:

1. A method for forming a Re-Cr alloy film, comprising performing an electroplating process using a plating bath which contains an aqueous solution including:

a perrhenate ion in a concentration of 0.0001 to less than 2.0 mol/L; and

a chromium (III) ion in a concentration of greater than 0.001 to 10.0 mol/L, wherein the molar ratio of the perrhenate ion to the chromium (III) ion in said plating bath is in the range of greater than 0.001 to less than 0.1,

wherein said plating bath has a pH of 0 to 8, and a temperature of 10 to 80°C.

2. A method for forming a Re-Cr alloy film, comprising performing an electroplating process using a plating bath which contains an aqueous solution including:

a perrhenate ion in a concentration of 0.0001 to less than 2.0 mol/L;

a chromium (III) ion in a concentration of greater than 0.001 to 10.0 mol/L; and

at least one ion selected from the group consisting of potassium, rubidium, cesium, calcium, strontium and barium ions, in a concentration of 0.001 to 10.0 mol/L,

wherein said plating bath has a pH of 0 to 8, and a temperature of 10 to 80°C.

3. The method as defined in claim 1 or 2, wherein said alloy film to be formed has a composition consisting of Re in the range of greater than zero to less than 98% by atomic composition, and the remainder being Cr except inevitable impurities.

4. A method for forming a Re-based film, comprising performing an electroplating process using a plating bath which contains an aqueous solution including:

a perrhenate ion in a concentration of 0.001 to 2.0 mol/L; and

a chromium (III) ion in a concentration of 0.01 to 10.0 mol/L, wherein the molar ratio of the perrhenate ion to the chromium (III) ion in said plating bath is 0.1 or more,

wherein said plating bath has a pH of 0 to 8, and a temperature of 10 to 80°C.

5. The method as defined in claim 4, wherein said film to be formed has a composition consisting of greater than 98% or more, by atomic composition, of Re, with the remainder being Cr and inevitable impurities.

6. The method as defined in either one of claims 1 to 5, wherein said plating bath contains an organic acid in a concentration of 0.1 to 15.0 equivalents to the concentration of all of said metal ions.

7. A method for forming a Re-Cr-Ni alloy film, comprising performing an electroplating process using a plating bath which contains an aqueous solution including:

a perrhenate ion in a concentration of 0.01 to 2.0 mol/L;

a chromium (III) ion in a concentration of greater than 0.8 to 4.0 mol/L; and

a nickel (II) ion in a concentration of 0.0001 to 0.2 mol/L,

wherein said plating bath has a pH of 0 to 8, and a temperature of 10 to 80°C.

8. The method as defined in claim 7, wherein the molar ratio of the chromium (III) ion to the nickel (II) ion in said plating bath is 2 or more.

9. The method as defined in claim 7 or 8, wherein said film to be formed has a composition consisting of Re in the range of 50 to less than 98% by atomic composition, Cr in range of 2 to less than 45% by atomic composition, and the remainder being Ni except inevitable impurities.

10. The method as defined in either one of claims 7 to 9, wherein said plating bath contains an organic acid and/or a boric acid, in a concentration of 0.1 to 5.0 equivalents to the concentration of all of said metal ions.

11. The method as defined in either one of claims 1 to 10, wherein said plating bath contains an ammonium ion in a concentration of 0.0001 to 5.0 mol/L, and/or a boric acid in a concentration of 0.0001 to 5.0 mol/L.

12. The method as defined in either one of claims 1 to 11, wherein said plating bath contains a bromine ion in a concentration of 0.0001 to 5.0 mol/L.

13. The method as defined in either one of claims 1 to 12, wherein said plating bath contains a sulfate ion in a concentration of 0.0001 to 5.0 mol/L, a chloride ion in a concentration of 0.0001 to 5.0 mol/L, a lithium ion in a concentration of 0.0001 to 5.0 mol/L,

a sodium ion in a concentration of 0.0001 to 5.0 mol/L, and/or a potassium ion in a concentration of 0.0001 to 5.0 mol/L.